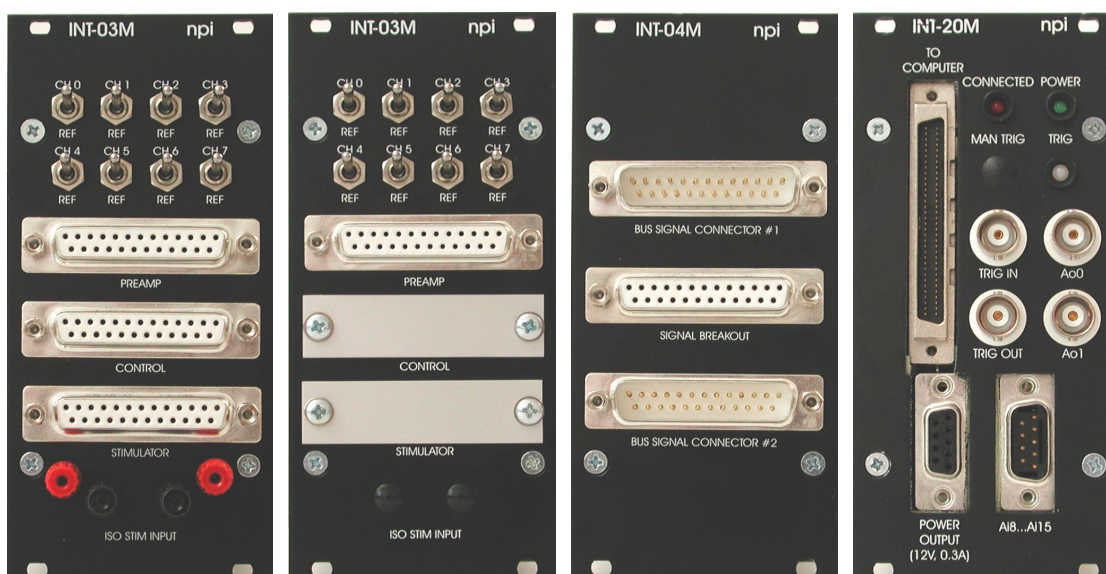


OPERATING INSTRUCTIONS AND SYSTEM DESCRIPTION FOR THE

INT-03M / INT-04M / INT-20M

BREAKOUT BOX MODULES FOR EPMS SYSTEMS



VERSION 1.0
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1. Safety Regulations

VERY IMPORTANT: Instruments and components supplied by npí electronic are NOT intended for clinical use or medical purposes (e.g. for diagnosis or treatment of humans), or for any other life-supporting system. npí electronic disclaims any warranties for such purpose. Equipment supplied by npí electronic must be operated only by selected, trained and adequately instructed personnel. For details please consult the **GENERAL TERMS OF DELIVERY AND CONDITIONS OF BUSINESS** of npí electronic, D-71732 Tamm, Germany.

- 1) **GENERAL:** This system is designed for use in scientific laboratories and must be operated only by trained staff. General safety regulations for operating electrical devices should be followed.
- 2) **AC MAINS CONNECTION:** While working with the npí systems, always adhere to the appropriate safety measures for handling electronic devices. Before using any device please read manuals and instructions carefully.
The device is to be operated only at 115/230 Volt 60/50 Hz AC. Please check for appropriate line voltage before connecting any system to mains.
Always use a three-wire line cord and a mains power-plug with a protection contact connected to ground (protective earth).
Before opening the cabinet, unplug the instrument.
Unplug the instrument when replacing the fuse or changing line voltage. Replace fuse only with an appropriate specified type.
- 3) **STATIC ELECTRICITY:** Electronic equipment is sensitive to static discharges. Some devices such as sensor inputs are equipped with very sensitive FET amplifiers, which can be damaged by electrostatic charge and must therefore be handled with care. Electrostatic discharge can be avoided by touching a grounded metal surface when changing or adjusting sensors. **Always turn power off when adding or removing modules, connecting or disconnecting sensors, headstages or other components from the instrument or 19" cabinet.**
- 4) **TEMPERATURE DRIFT / WARM-UP TIME:** All analog electronic systems are sensitive to temperature changes. Therefore, all electronic instruments containing analog circuits should be used only in a warmed-up condition (i.e. after internal temperature has reached steady-state values). In most cases a warm-up period of 20-30 minutes is sufficient.
- 5) **HANDLING:** Please protect the device from moisture, heat, radiation and corrosive chemicals.
- 6) **I/O BOARDS:** This breakout box can be used only with computer boards from National Instruments. These I/O boards must be installed and configured first. For the correct installation and configuration read the user manual of the appropriate board (shipped with the board).
- 7) **VERY IMPORTANT:** Always turn power off when connecting or disconnecting components at the rear panel of the breakout box to avoid any damage.

2. EPMS-07 Modular Plug-In System

2.1. Components of the EPMS-07 Housing

The following items are shipped with the EPMS-07 housing:

- ✓ EPMS-07 cabinet
- ✓ Power cord
- ✓ Fuse 0.8 / 0.4A, slow
- ✓ Front covers

2.2. General System Description / Operation

The npf – EPMS-07 is a modular system for processing of bioelectrical signals in electrophysiology (see Figure 1). The system is housed in a 19" rackmount cabinet (3U) containing a power supply and has room for up to 7 plug-in units. The plug-in units are connected to power by a bus at the rear panel.

The plug-in units must be kept in position by four screws (M 2,5 x 10). The screws are important not only for mechanical stability but also for proper electrical connection to the system housing. Free area must be protected with covers.

In order to avoid induction of electromagnetic noise the power supply unit, the power-switch and the fuse are located at the rear of the housing.

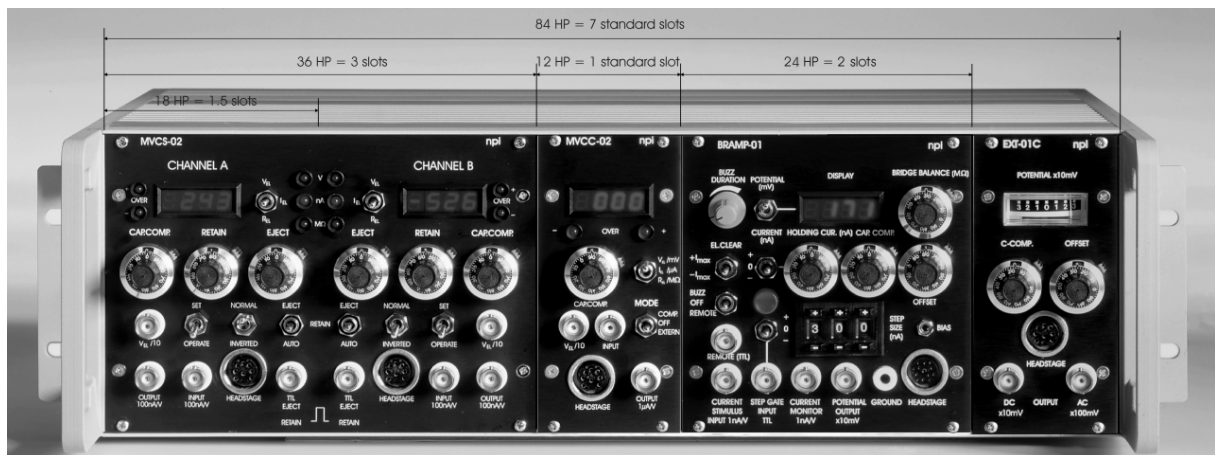


Figure 1: Example of a measurement system located in an EPMS housing with two channel iontophoresis and balance module (MVCS-02, MVCC-02), bridge amplifier module (BRAMP-01R) and an extracellular amplifier module (EXT-01C)

2.3. System Grounding

The 19" cabinet is grounded by the power cable through the ground pin of the mains connector (= protective earth). In order to avoid ground loops the internal ground is isolated from the protective earth. The internal ground is used on the BNC connectors or GROUND plugs of the modules that are inserted into the EPMS-07 housing. The internal ground and mains ground (= protective earth) can be connected by a wire using the ground plugs on the rear panel of the instrument. It is not possible to predict whether measurements will be less or more noisy with the internal ground and mains ground connected. We recommend that you try both arrangements to determine the best configuration.

2.4. Technical Data

- 19" rackmount cabinet, 3U high (1U=1 3/4" = 44.45 mm), for up to 7 plug-in units
- Power supply: 115/230 Volts AC, 60/50 Hz, fuse 0.8/0.4 A slow, 45-60 W

3. Breakout Box Module System

3.1. Components

The following items are shipped with the INT-03M:

- ✓ Two INT-03M modules
- ✓ Two modified INT-20M modules
- ✓ One INT-04M module
- ✓ User manual

3.2. System Description

The system connects two Tucker-Davis headstages to two PCI-6341 multifunction I/O boards from National Instruments. The system consist of two INT-03M, one INT-04M module and two modified INT-20M modules. These are used in conjunction with 16 DPA-2FL modules and a separate stimulus isolator.

INT-03M

Eight switches allow each input channel to function as reference or as measuring channel. Three 25-pole SUBD connectors are used for connection to other EPMS housings in the system, and stimuli from two stimulus isolators can be connected by four banana jacks.

Description of the Front Panel

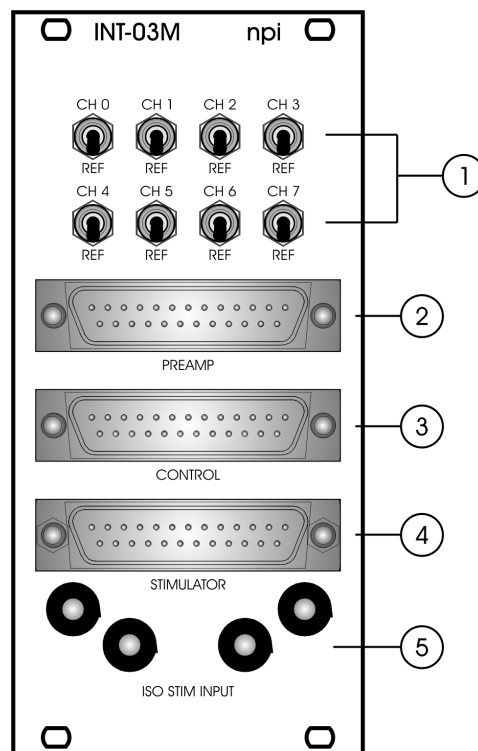


Figure 2: INT-03M front panel view

In the following description of the front panel elements each element has a number that is related to that in Figure 2. The number is followed by the name (in uppercase letters) written on the front panel and the type of the element (in lowercase letters). Then, a short description of the element is given.

(1) Channel type selectors

Switches for selecting the operation mode of the respective channel, e.g. for channel 0

CH 0: Channel 0 operates as measuring channel

REF: Channel 0 operates as reference channel

(2) Headstage connector PREAMP

25-pole SUBD connector for the PREAMP line of the headstage

(3) Headstage connector CONTROL

25-pole SUBD connector for the CONTROL line of the headstage (only in H-Rec-Stim headstage)

(4) Headstage connector STIMULATOR

25-pole SUBD connector for the STIMULATOR line of the headstage (only in H-Rec-Stim headstage)

(5) ISO STIM INPUT connectors

Connectors for the stimulus signals from maximum two stimulus isolators (only in H-Rec-Stim headstage).

The headstages suitable for this systems are different. One headstage (H-Rec) is only for recording, the other headstage (H-Rec-Stim) is for recording and stimulation. Therefore, connectors (3) and (4) are available only for the H-Rec-Stim headstage.

INT-04M

The INT-04M breakout box serves as distribution module for signals coming from and going to DPA-2FL amplifier modules. It collects the signals from the three EPMS housings and passes them to the modified INT-20M modules.

Description of the Front Panel

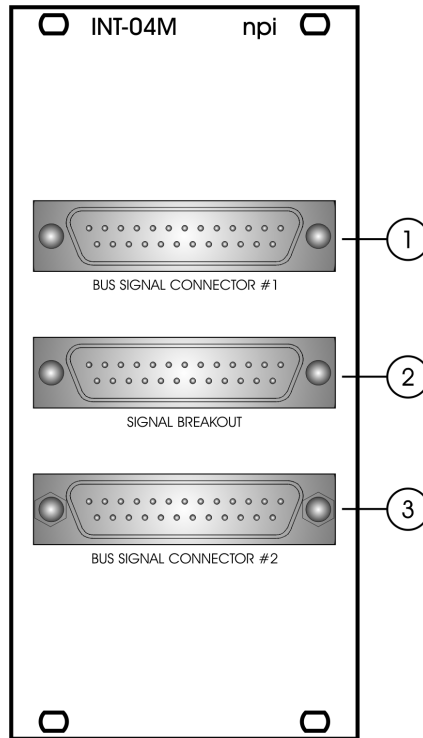


Figure 3: INT-04M front panel view

(1) BUS SIGNAL CONNECTOR #1

25-pole SUBD connector for the from and to EPMS #1

(2) SIGNAL BREAKOUT

For internal use only

(3) BUS SIGNAL CONNECTOR #2

25-pole SUBD connector for the from and to EPMS #2

The INT-04M breakout box is connected to the INT-20M modules with two 25/9 pole cables.

INT-20M

The modified INT-20M breakout box serves as distribution module for signals coming from and going to DPA-2FL amplifier modules. It collects the signals from the three EPMS housings and passes them to the data acquisition board from National Instruments. It also allows connection of the digital I/O lines of the PCI-6143.

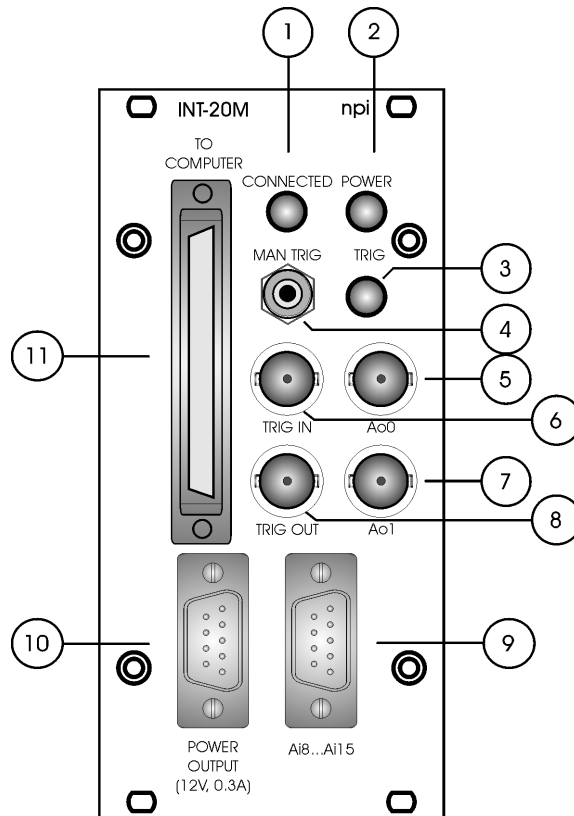
Description of the Front Panel

Figure 4: modified INT-20M breakout box front panel view

(1) CONNECTED LED

LED indicating that a data acquisition board is connected properly.

(2) POWER LED

LED indicating that a the EPMS-07 system is powered on.

(3) TRIG LED

Not installed

(4) MAN TRIG switch

Not installed

(5) Ao0 connector

BNC connector for digital line 6 from the data acquisition board.

(6) TRIG IN connector

BNC connector for digital line 4 from the data acquisition board.

(7) Ao1 connector

BNC connector for digital line 7 from the data acquisition board.

(8) TRIG OUT connector

BNC connector for digital line 5 from the data acquisition board.

(9) Ai8...Ai15 connector

SUBD 9-pole female connector for connecting EPMS #2 to EPMS #1 and EPMS #3, respectively.

(10) POWER OUTPUT connector

SUBD 9-pole female connector for digital lines 0 to 7.

(11) TO COMPUTER connector

SCSI 68-pole female connector for connecting the data acquisition board from National Instruments.

4. Connections

The connections of the system are illustrated in Figure 5.

The recorded signals from the headstages are collected by the INT-03M modules and passed to the DPA-2FL modules for amplification and filtering. Reference and recording electrodes are defined by the INT-03M modules as well. The processed signals are linked to the two PCI-6143 boards using the INT-04M module and two modified INT-20M modules.

The outputs of one or two stimulus isolators can be connected to the INT-03M modules of EPMS #1 for stimulation. These signals are linked to the H-Rec-Stim headstage. The electrodes are switched between recording and stimulation by software through signals connected to CONTROL connector of the INT-03M in EPMS #1.

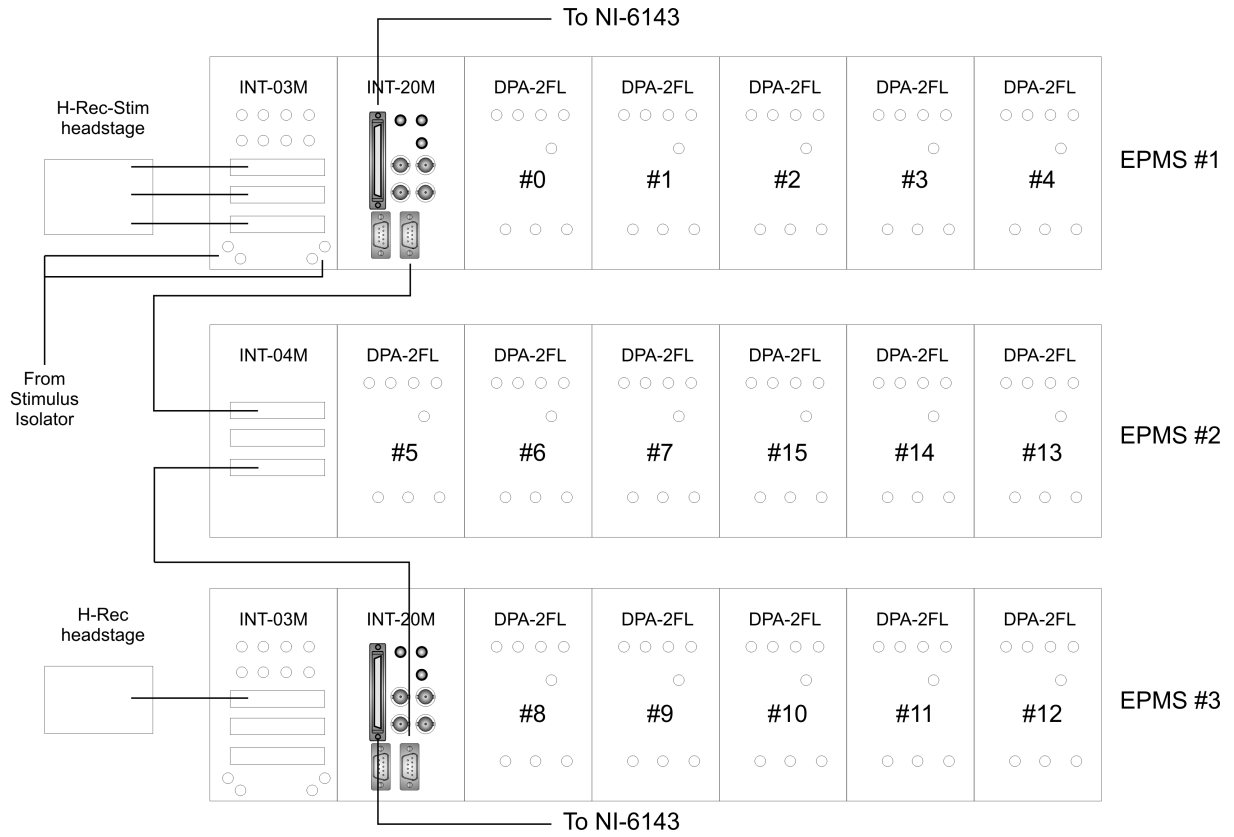


Figure 5: connection scheme

